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### REMARKS

Claims 1-4 and 6-27 are all the claims presently being examined in the application. Applicant gratefully acknowledges the Examiner's indication that claims 12, 13, 20, 21, 23 and 26 are allowable if rewritten in independent form. Applicant has elected, at this time, not to rewrite these claims.

Claims 1 and 2 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Barthelmes et al. (U.S. Patent No. 5,001,395). Claims 3, 4, 6, 7-11, 15, 16 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Barthelmes et al. in view of Honda et al. (U.S. Patent No. 6,249,086). Claims 14 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Barthelmes et al. in view of Honda et al. and further in view of Takeuti et al. (U.S. Patent No. 6,211,616). Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Barthelmes et al. in view of Honda et al. and further in view of Genz (U.S. Patent No. 5,635,796).

These rejections are respectfully traversed in view of the following discussion.

Entry of this 1.116 Amendment is proper. Since the amendments above narrow the issues for appeal and since such features were in the claims earlier, such amendments do not raise a new issue requiring further searching and/or consideration by the Examiner. As such entry of this Amendment is believed to be proper and is earnestly solicited.

It is noted that the amendments are made only to more particularly define the invention and not for distinguishing the invention over the prior art, for narrowing the scope of the claims, or for any reason related to a statutory requirement for patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

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## I. THE CLAIMED INVENTION

Applicant's invention, as disclosed and claimed, for example by claim 1, is directed to a high pressure discharge lamp.

The high pressure discharge lamp includes a quartz glass bulb, a conductive element which is airtightly sealed at a sealing portion of the quartz glass bulb, and a pair of electrodes, each electrode of the pair of electrodes being disposed in the quartz glass bulb so as to be opposite the other and each electrode of the pair of electrodes being connected to the conductive element.

A key feature of the invention is that a part of each electrode of the pair of electrodes is sealed with the quartz glass bulb at the sealing portion so as to generate a contacting portion formed by the part of each electrode of the pair of electrodes and the quartz glass bulb, and a maximum length  $L_{\max}$  of the contacting portion is defined as:  $L_{\max} (\text{mm}) \leq 200/(P \times D)$ , and a minimum length,  $L_{\min}$  of the contacting portion is defined as:  $L_{\min} (\text{mm}) \geq 0.8/(D^2 \times \pi)$  or  $L_{\min} (\text{mm}) \geq 0.7$  whichever is longer, where  $D$  is the diameter (mm) of the corresponding electrode of the pair of electrodes and  $P$  is the power (W) supplied to the corresponding electrode of the pair of electrodes. Importantly, the contacting portion terminates inside and beyond an edge of a foil. (See Page 11, line 14-Page 12, line 17; Page 19, line 17-Page 20, line 18; and Figures 1 and 7).

A second embodiment, as disclosed and claimed, for example by claim 6, is directed to a high pressure discharge lamp, which includes a quartz glass bulb, conductive elements, the conductive elements being airtightly sealed at sealing portions of the quartz glass bulb, and a pair of electrodes, each electrode of the pair of electrodes being disposed so as to be opposite the other and each of the electrodes being connected to one of the conductive elements. The  $R_{\max}$  of a contacting portion of each of the electrodes is about  $5\mu\text{m}$  or less.

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The  $R_{\max}$  is a maximum of an absolute value of a difference between a distance from an axial center of each of the electrodes to a particular point on a surface of each of the electrodes and a mean value of the distance. The contacting portion terminates inside and beyond an edge of a foil. (See Page 11, line 14-Page 12, line 17; Page 19, line 17-Page 20, line 18; and Figures 1 and 7).

Conventional art depicts a high pressure discharge lamp with long contact portions as well as electrodes without any roughness of the surface. However, the conventional art with a long contacting portion tends to form cracks at the sealing portion "due to the difference between the thermal expansion coefficient of the electrode and the quartz glass bulb." In addition, conventional art without any surface roughness on the electrodes tends to cause sputtering of the electrode, and thus blackening of the bulb. (See Page 4, lines 3-10; and Page 5, lines 13-18).

The invention includes a contacting portion which terminates inside and beyond an edge of a foil, which suppresses crack formation while supporting the electrode, and thus prevents failing and sputtering of the electrode. (See Page 5, lines 6-21; Page 11, line 14-Page 12, line 17; Page 13, lines 10-13; and Page 14, lines 6-9; Page 19, line 17-Page 20, line 18; and Figures 1 and 7).

As a result of this inventive structure, blackening of the bulb as well as a blowout of the bulb are significantly prevented "even after being lit for a considerably long time." (See Page 5, lines 3-5).

## II. THE PRIOR ART REJECTIONS

### A. The § 102(b) Rejection Based on Barthelmes

Barthelmes, et al. ("Barthelmes") fails to teach or suggest the features of independent

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claim 1, including a contacting portion which terminates inside and beyond an edge of a foil.  
(See Page 11, line 14-Page 12, line 17; Page 19, line 17-Page 20, line 18; and Figures 1 and 7).

In particular, the contacting portion,  $L$ , has a precise, specific minimum length,  $L_{min}$ , and a maximum length,  $L_{max}$ , as defined by  $L_{max}(\text{mm}) \leq 200/(P \times D)$ ; and the minimum length,  $L_{min}$  of the contacting portion is defined as:  $L_{min}(\text{mm}) \geq 0.8/(D^2 \times \pi)$  or  $L_{min}(\text{mm}) \geq 0.7$  whichever is longer. The length,  $L$ , can not be either too long or too short as the maximum length,  $L_{max}$ , tends to prevent weakening of the contacting portion and suppression of cracks at the contacting portion and the minimum length,  $L_{min}$ , tends to maintain the strength of the portion supporting the electrode and prevent falling of the electrode. (See Page 5, lines 6-12; Page 12, line 8-13; Page 13, lines 10-13; and Page 14, lines 6-9). Therefore, the problems of blackening of the bulb and a blowout of the bulb are significantly prevented "even after being lit for a considerably long time." (See Page 5, lines 3-5).

Instead, Barthelmes only teaches "a suitable dimension" of the electrode shaft,  $l_e$ , not a precise, specific range of the specific maximum length,  $L_{max}$ , and a minimum length,  $L_{min}$  of a contacting portion,  $L$ . Further, the Examiner indicates that "the contacting portion disclosed by Barthelmes extends from the sealing portion to the edge of the foil, and though the electrode extends into the foil, the contacting portion as defined in column 3, lines 49-51 terminates at the edge of the foil." (See Office Action, Page 9, lines 6-9). Accordingly, Barthelmes certainly does not teach the contacting portion terminates inside and beyond an edge of a foil as disclosed in Applicant's invention. Indeed, Barthelmes is focused on improving the corrosion protection of the electrodes so a suitable range of the length of a contacting portion is not taught, disclosed or suggested as part of the invention. (See Column 1, lines 50-65).

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Thus, the Barthelmes lamp like other conventional devices may tend to form cracks at the sealing portion "due to the difference between the thermal expansion coefficient of the electrode and the quartz glass bulb." (See Page 4, lines 3-10; and Page 5, lines 13-18). Accordingly, Barthelmes only discloses that the electrode shaft has "suitable" dimensions.

Barthelmes, therefore, does not teach, suggest or disclose a contacting portion which terminates inside and beyond an edge of a foil.

B. The § 103 Rejections of Claims 3, 4, 6-11, 15, 16, 19 and 25

First, the references, separately, or in combination, fail to teach, disclose or provide a reason or motivation for being combined. In particular, Barthelmes pertains to a conventional high-pressure discharge lamp with a quartz glass discharge chamber and corrosion protected electrode leads. As indicated, this structure also includes "a suitable dimension" of the electrode shaft,  $l_E$ , without a range nor a surface roughness at the end portion of the electrode. (See Office Action at Page 4, Section 5). Accordingly, Barthelmes is specifically directed to improving the corrosion protection of the electrodes where the "discharge vessel includes a fill with which [h]as highly corrosive additives therein in order to provide light output at a desired color temperature." (See Barthelmes at Abstract; Column 1, lines 50-65; and Figure 1).

By contrast, Honda, et al. ("Honda") does not have the same aim as Barthelmes.

Honda discloses a conventional high-pressure discharge lamp including a light transmitting air-tight discharge container, an electrode formed of tungsten sealed in the discharge container and a discharge medium containing a halide of a light emitting metal with a surface roughness. (See Honda at Abstract; Column 1, lines 10-23). This configuration attempts to reduce the carbon impurities on the surface of the electrode, which diminishes the

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blackening of the bulb, and thus may not decrease the luminous flux within 100 hours of lighting. (See Column 3, lines 28-55).

Nothing within Barthelmes, which relates to corrosion protection without a surface roughness on the electrode, suggests a high-pressure discharge lamp to reduce the carbon impurities on the surface of the electrode and not decrease the luminous flux within 100 hours of lighting with a specific surface roughness of the electrode as disclosed in Honda. Thus, Barthelmes teaches away from being combined with another invention, such as, Honda.

Therefore, one of ordinary skill in the art would not have combined these references, absent hindsight. It is clear that the Examiner has simply read Applicant's specification and conducted a keyword search to yield Barthelmes and Honda. The Examiner provides no motivation or reason to combine other than to assert that it would have been obvious to one having ordinary skill in the art at the time to attempt to make the bulb of Barthelmes into a long life bulb by incorporating an electrode with a surface roughness of an electrode from Honda. Such an assertion does not take into account the distinct structural differences of the two inventions as indicated above, and further discussed below. Thus, the Examiner's conclusion attempts to solve a problem which may not exist with either Barthelmes or Honda.

Second, even if combined, the references do not teach or suggest the features of independent claims 1 and 6, including a contacting portion which terminates inside and beyond an edge of a foil.

Honda does not make up for the deficiencies of Barthelmes. Instead, Honda discloses a conventional high-pressure discharge lamp including with an electrode formed of tungsten sealed in the discharge container and a discharge medium containing a halide of a light emitting metal with a surface roughness. The electrode only appears to extend to the edge of the sealing metal portion of the feed conductor and does not teach or suggest any contacting

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portion. (See Honda at Abstract; Column 1, lines 10-23; Column 16, lines 7-21; and Figure 1).

In contrast, Applicant's invention includes a contacting portion which terminates inside and beyond an edge of a foil. In particular, the contacting portion is a discrete portion of the electrode referred to as L, which extends into the foil. (See Page 6, lines 17-24; and Page 18, line 15-Page 19, line 16).

Accordingly, Honda, does not disclose, teach or suggest any contacting portion, let alone, Applicant's feature of the contacting portion terminating inside and beyond an edge of a foil.

Therefore, neither Barthelmes nor Honda teaches or suggests, a contacting portion which terminates inside and beyond an edge of a foil as recited in claim 6 as well as independent claim 1.

For at least the reasons outlined above, Applicant respectfully submits that neither Barthelmes nor Honda disclose, teach or suggest all of the features of the independent claim 6 and dependent claims 3, 4, 7-11, 15, 16, 19 and 25. Additionally, the dependent claims are patentable not only by virtue of their dependency from the respective independent claims 1 and 6, but also by the additional limitations they recite.

#### C. The § 103 Rejection of Claims 14, 17, 24, and 27

To make up for the deficiencies of Barthelmes and Honda discussed above, the Examiner relies on Takeuti, et al. ("Takeuti"). Takeuti fails to do so.

First, Takeuti does not have the same aim as either Barthelmes or Honda as discussed above, and the urged combination would not have been made, absent hindsight.

Secondly, Takeuti does not disclose, teach or suggest a contacting portion which terminates inside and beyond an edge of a foil as recited in claims 1 and 6.

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Further, Takeuti does not disclose, teach or suggest including where a mercury vapor is contained in the high pressure discharge lamp in an amount between about 0.12 and 0.3 mg/mm<sup>3</sup> as recited in claim 14 of the invention. Further, Takeuti does not disclose, teach or suggest including the pair of electrodes comprises tungsten containing potassium oxide as recited in claim 17. Takeuti also does not disclose, teach or suggest including the distance between each electrode is 1.0-2.0 mm as recited in claim 24. Takeuti further does not disclose, teach or suggest including the potassium oxide is no more than 30 ppm as recited in claim 27.

Instead, Takeuti recites a high pressure discharge lamp without any contacting portion, let alone, a contacting portion which terminates inside and beyond an edge of a foil. Please note, Takeuti also does not have any surface roughness on an electrode. (See Takeuti at Abstract; and Figure 1). Since the lamp does not have any contacting portion or any surface roughness, Takeuti is deficient and thus does not teach the specific limitations of dependent claims 14, 17, 24 and 27.

For the reasons stated above, the claimed invention defined by dependent claims 14, 17, 24 and 27 is fully patentable over the cited references.

#### D. The § 103 Rejection of Claim 18

To make up for the deficiencies of Barthelmes and Honda, the Examiner relies on Genz. Genz fails to do so.

First, Genz does not have the same aim as either Barthelmes or Honda as discussed above, and the urged combination would not have been made, absent hindsight.

Genz further does not disclose, teach or suggest a contacting portion which terminates inside and beyond an edge of a foil as recited in claim 6, let alone, including the bulb wall loading in the high pressure discharge lamp is about 0.8 W/mm<sup>2</sup> or more as recited in claim



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18.

Instead, Genz recites a high pressure discharge lamp without any contacting portion let alone, terminating inside and beyond an edge of a foil. Please note, Genz also does not recite any surface roughness on an electrode. (See Genz at Abstract; and Figure 1). Since the lamp does not have any contacting portion or any surface roughness, Genz is deficient and thus does not teach the specific limitations of dependent claim 18.

For the reasons stated above, the claimed invention defined by dependent claim 18 is fully patentable over the cited references.

#### E. The § 103(a) Rejection of Claim 22

To make up for the deficiencies of Barthelmes, the Examiner relies on Sugitani, et al. (Sugitani"). Sugitani fails to do so.

First, Sugitani does not have the same aim as Barthelmes. Sugitani, which relates to preventing "formation and spreading of milky opacification in the fused silica glass forming the discharge vessel," has nothing to do with "corrosion protection" as discussed above in Barthelmes, and the urged combination would not have been made, absent hindsight. (See Sugitani at Abstract; and Column 3, lines 44-51).

Sugitani further does not disclose, teach or suggest a contacting portion which terminates inside and beyond an edge of a foil as recited in claim 1, let alone, including the high pressure discharge lamp includes an internal pressure of at least 8 MPa as recited in claim 22.

Instead, Sugitani recites a high pressure discharge lamp with a specific amount of mercury, a halogen and a wall loading amount without any contacting portion. (See Sugitani at Abstract; and Figure 1). Since the lamp does not have any contacting portion, let alone, a contacting portion terminating inside and beyond an edge of a foil, Sugitani is deficient and

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thus does not teach the specific limitations of dependent claim 22.

For the reasons stated above, the claimed invention defined by dependent claim 22 is fully patentable over the cited references.

#### IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-4 and 6-27, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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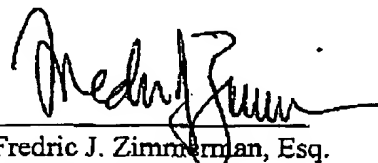
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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date:

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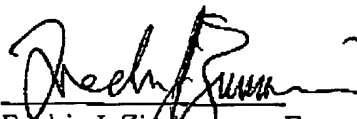


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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that I am filing this Amendment by facsimile with the United States Patent and Trademark Office to Examiner Sharlene L. Leurig, Group Art Unit 2879 at fax number (703) 872-9319 this 17<sup>th</sup> day of July, 2003.



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